**Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Homework Set #1**

1. The structure of urea is shown below. Fill in any non-bonding valence electrons (lone pairs) that are missing from the line-bond structure.

2. The carbon atom in urea is

a.) sp3 hybridized

b.) sp2 hybridized

c.) sp hybridized

d.) not hybridized

3. What is the predicted NH2—C=O bond angle in urea?

a.) 109.5°

b.) 120°

c.) 180°

d.) not predictable

Propose possible structures for a molecule that meets each of the following descriptions:

4. Contains two sp3 hybridized carbons and two sp hybridized carbons.

5. Contains one sp3 hybridized carbon and two sp2 hybridized carbons.

Write valid line-bond structures for each of the compounds listed below. Show all lone pairs of electrons where necessary.

6. C2Cl4 (tetrachloroethylene)

7. CO2 (carbon dioxide)

8. CH4O (methanol)

How many valence electrons does each element have in its valence shell?

9. silicon

10. carbon

11. magnesium

12. phosphorous

13. oxygen

For questions 14-23 give the letter of the term that best matches the given definition.

1. Brønsted-Lowry Acid f. Ionic Bond
2. Brønsted-Lowry Base g. Covalent Bond
3. Lewis Acid h. Polar-Covalent Bond
4. Lewis Base i. Hydrophobic
5. Electronegativity j. Hydrophilic

\_\_\_\_\_14. Any species that can accept electrons.

\_\_\_\_\_15. A bond between two atoms differing in electronegativity by 0.5 – 2.

\_\_\_\_\_16. A term used to describe a “water loving” species.

\_\_\_\_\_17. A compound that can donate a proton.

\_\_\_\_\_18. The ability of an atom to attract the shared electrons in a covalent bond.

\_\_\_\_\_19. A term used to describe a “water fearing” species.

\_\_\_\_\_20. Any species that can donate electrons.

\_\_\_\_\_21. A bond between two atoms differing in electronegativity by < 0.5

\_\_\_\_\_22. A compound that can accept a proton.

\_\_\_\_\_23. A bond between two atoms differing in electronegativity by > 2.

24. Circle all the Lewis bases in the group of compounds below.



25. Circle all the Lewis acids in the group of compounds below.



26. Draw two resonance structures for the species shown below.



27. Draw two resonance structures for the species shown below.

